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ABSTRACT

In order to assess the effect of relaxation training and imagination exercises on the creativity of elementary-age students, 94 children in first through fourth grades were randomly assigned to either a treatment or control group. Prior to the treatment, all students were pretested on the Torrance Tests of Creative Thinking. Children in the experimental group participated in relaxation training and imagination exercises during their scheduled weekly homeroom session, while children in the control group did not. Twelve weekly relaxation-imagination sessions of between 20 and 40 minutes each were conducted. Findings did not support the proposition that relaxation training and imagination exercises will enhance children's creativity. (Appended are a weekly session outline, 12 statistical tables, and a cover sheet from the Northern Rocky Mountain Educational Research Association's first annual meeting.) (BJD)

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The Effect of Relaxation and Imagination Exercises on the Creativity of Elementary Children

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Introduction

In today's ever-changing world where economic, political and environmental problems are present at a global level and where personal problems can lead to emotional and physical illness if unsolved, creativity is surely one of our most valuable resources. Many people believe that creativity is a gift bestowed only on a few people, yet it is generally agreed by researchers that creativity is available to all humans (Arieti, 1976; Shallcross, 1981). Each of us has a creative potential which can be realized if only it is nourished by the proper physical, mental and emotional climate (Shallcross, 1981). Realization of creative potential benefits society, for creative individuals can solve problems, create works of art, advance new theories to help us understand our world, and evoke laughter. In addition, realization of creative potential benefits individuals since it allows each person to express and to fulfill oneself. "What satisfies the need for self-fulfillment for one person can be drastically different for another. The theoretical person is capable of the type of abstract thought that can solve the problems that plague all humankind, yet he or she still needs to rely on the kind of plumber who takes pride in his or her work and solves a different kind of problem. Creativity is everybody's business" (Shallcross, 1981, p. 3).

Given that creativity is a quality that should be nourished, the question of how schools might help to nourish it arises. One way in which educators can find answers to this question is to examine the creative process. After studying the reports of many creative individuals, Wallas (1926) proposed a four-stage theory of creativity. The four stages are preparation, incubation, illumination, and verification. The first and last stages require conscious

effort and hard work.

The stages of incubation and illumination, however, are characterized by the unconscious workings of the mind. Following initial preparation, the creative seed must have time to germinate. The germination takes place in the incubation stage, a period which may last days or years (Wallas, 1926). The incubation period is one in which no conscious thought is given to the problem one wishes to solve or to the product one wishes to create. Yet during incubation the mind is not at rest but rather uses primary processes including imagery to discover new relationships between the elements stored in the mind during preparation. Arieti (1976) hypothesizes that it is the intricate combinations of the primary processes and secondary processes (conscious logic) as well as their separate workings through which "in what seems a 'magic synthesis'...the new, the unexpected, and the desirable emerge" (p. 13).

Illumination, the third stage, is the one in which the results of the incubation period make their way into conscious awareness. The solution or discovery commonly flashes into awareness, oftentimes in the form of an image. It has been hypothesized that to experience the imagery of illumination requires a tuning into the nonconscious mind so that transformations which have been made there can make their way into conscious awareness (Rugg, 1963). This tuning in appears to be achieved through relaxed concentration and reduction of sensory stimulation. These two conditons enhance the probability that an individual will be aware of and will attend to the inner world of stimulus events (Richardson, 1969). Reaching an altered state of consciousness where one is both relaxed yet attentive and where sensory input, both internal and external, is at a minimum can be achieved in a variety of ways including meditation, hallucinogenic drugs, sleep deprivation, sensory deprivation,

biofeedback, and relaxation (Arieti, 1976; Richardson, 1969; Rugg, 1963). Rugg (1963) calls this altered state the Taoist state of no mind where "in one way or another, we get the conscious mind off guard so that contacts on the fringe of consciousness can be established. Then the spark explodes the meaning" (p. 11).

This examination of the creative process reveals then that both conscious and nonconscious thought are important and that imagery and imagination are as crucial as orderly, logical thinking. One way that educators might nurture their students' creativity would be to help them become aware of their imaginations and to tune into their nonconscious minds. Clearly hallucinogenic drugs, sleep deprivation, and sensory deprivation are not appropriate to a school setting. On the other hand, relaxation techniques might prove to be both feasible and affordable.

Relaxation training can take many forms. Methods include systematic desensitization, yoga, meditation, guided fantasy, biofeedback, and deep muscle relaxation (Proeger, 1982). Systematic desensitization has primarily been used in a counseling setting to reduce test anxiety. Yoga methods including breathing exercises and postures are easily adapted to a classroom setting although it is recommended that the teacher has some background in yoga before attempting to teach it. Deep muscle relaxation which "involves developing awareness of muscular tension and training in muscle relaxation" (Proeger, 1982, p. 21) is also appropriate to a classroom setting. Meditation has a religious connotation to some people, but this drawback can be overcome with careful explanation by the teacher who plans to use it. Guided fantasy "can provide a feeling of calmness, as well as being a stimulus for self-exploration or creative imagination.... Children enjoy fantasy. The combination of relaxation training with the use of positive and calming images can be

a powerful tool" (Proeger, 1982, p. 20).

Biofeedback can also be used to teach relaxation, yet it often proves to be too costly since both the equipment and skilled personnel are expensive. The type of biofeedback equipment which would be most appropriate for creativity training would be brainwave feedback. In this type of feedback, an instrument called an encephalograph analyzer is used to train a person to maintain brain waves in the alpha range by learning to sense and control the state of consciousness where these waves are prevalent (Matthews, 1982).

"Alpha rhythms are from 8 to 12 Hz or cycles per second. Metabolically speaking, it is associated with a low arousal level. It is estimated that 90 percent of the human population produces brief outbursts of alpha waves hundreds of times each day when these members of the population close their eyes for a second or two, and also when their attention is focused on some interior image or daydream, even if their eyes are open" (Matthews, 1982, p. 2). Alpha rhythms have been linked to creativity because when one's brain waves are in the alpha range, the person is in "a state of inward-turned abstract attention or internal scanning" (Green, Green, & Walter, 1970, p. 10) and thus may be able to tune into the imagery of incubation and illumination. Learning to produce alpha waves through the feedback provided by an encephalograph analyzer may help subjects to become aware of their inner imagery and thereby to become more creative.

Although the cost of the equipment and the personnel needed to run the equipment make this form of biofeedback prohibitive for most schools, there is evidence that inexpensive temperature control biofeedback may be used as a rough substitute by teachers. In a study correlating alpha wave measures to wrist temperature feedback, Matthews (1982) found "that wrist temperature could be used as a rough measure of relaxation states, also measured by the

brain-wave frequency" (p. 10.

There is some direct evidence that the teaching of relaxation techniques will enhance creativity in students. The relaxation response, "an integrated central nervous system reaction" (Benson, Beary, & Carol, 1974, p. 37) which is elicited by various relaxation techniques, includes decreased oxygen consumption, respiratory rate, heart rate and muscle tension and increased skin resistance and alpha wave activity. These physiological changes are in direct contrast to those experienced when one is anxious and under stress. It has been found that "anxiety generally impairs children's performance on verbal and non-verbal problem-solving tasks...[and] that anxiety in children is negatively related to scores on tests of creativity and curiosity (Proeger, 1982, p. 15). It would seem then that eliciting the relaxation response in students would improve their scores on tests of problem-solving, creativity, and curiosity.

One study (Kearns, 1979) investigated the effect of relaxation exercises and guided imagery on creative thinking of fourth-, fifth-, and sixth-grade students identified as gifted and placed in a special program for the gifted. Half of the subjects (N=51) were assigned to a control group while half participated in eight one-half hour weekly sessions of relaxation and guided imagery. When all subjects were posttested with the Torrance Tests of Creative Thinking, Verbal Form A, a 2-way ANOVA found that the treatment group in each grade scored significantly higher than the control group in each grade on fluency, felxibility, and originality.

While the latter study focused on gifted children, the present study focused on the effect of relaxation training and imagination exercises on the creativity of elementary students in general. This study tested the hypothesis that relaxation training coupled with imagination exercies will increase the

creativity scores of first- through fourth-grade students. No hypotheses were made in regard to which of the creativity subscores would increase the most.

Method

Subjects

The sample was ninety-four (N=94) students enrolled in grades one through four at University School, the lab school associated with the University of Wyoming, College of Education, Laramie, Wyoming.

Procedure

All students enrolled in each of the four grades participated in the study. Students from each grade level were randomly assigned to either a treatment group or a control group. Thus there were a treatment group and a control group for each grade level. Prior to the introduction of the treatment, all students were pretested with Figural Form A of the Torrance Tests of Creative Thinking (TTCT).

Following pretesting, the students in the treatment groups participated in relaxation training and imagination exercises during their scheduled weekly homeroom session. There were twelve sessions, once per week, each lasting from twenty to forty minutes. Due to holidays and scheduling conflicts, there were some weeks when no treatment session was conducted. One researcher worked primarily with the first- and second-grade groups while the other researcher worked primarily with the third- and fourth-grade groups. There were occasions when the two researchers substituted for one another. While the treatment groups were involved in the relaxation-imagination sessions, the control groups participated in normal homeroom activities planned and led by their homeroom teachers.

The weekly treatments were designed by the researchers who drew on a

variety of resources. The sessions always began with a relaxation exercise which was followed by some sort of imagination exercise such as a fantasy journey, creative writing or art work, mind/body exercise, or pantomime (see Appendix A).

In order to help the children understand the concept of relaxation, the researchers used temperature biofeedback in the form of small cards called SPC Temperature-Tension Colorimeters (SPC Center, P.O. Box 49939, Los Angeles, CA 90049). These cards measure temperature of one's fingertips and change color from black to red to green to blue as anxiety lessens and blood flows more freely to the fingertips. These devices allowed the children to see the concept of relaxation versus tension and to monitor their own stress levels. They were quite excited by their ability to reach the green and blue levels.

After the treatment sessions were completed, all students were posttested with Figural Form B of the TTCT. Before they began the posttest, all of the children did a short relaxation exercise and used the Colorimeters to monitor their relaxation response.

Instrument

Creativity was assessed with alternate forms of the Torrance Tests of Creative Thinking, Figural Tests A and B. Numerous reliability and validity analyses have been performed on the TTCT and it has proven to be both reliable and valid (Torrance, 1974). The instrument is a paper and pencil test which includes three figural activities "that require kinds of thinking analogous to the thinking involved in recognized creative achievements" (Torrance, 1974, p. 11). The three activities are the Picture Construction Activity, the Incomplete Figures Activity, and the Repeated Figures Activity.

Both the pretest and the posttest were scored by trained scorers from

the Scholastic Testing Service. These scorers maintain a high degree of interscorer reliability (.90) and have no significant ($p < .05$) difference in means. The tests were scored using the streamlined scoring method. This method provides raw scores for each individual in each of the following areas: fluency, originality, abstractness of titles, elaboration, and resistance to closure. The fluency score is based on the total number of relevant responses. The originality score is based on the statistical infrequency and unusualness of the response. The abstractness of titles score relates to the subject's synthesizing and organizing processes of thinking. The elaboration score is based on the imagination and exposition of detail. The resistance to closure score is based on the child's ability to delay closure long enough to make the mental leaps that make original ideas possible. In addition, each child receives a creativity index which serves as an overall indicator of creative potential.

Results

An analysis of covariance was calculated in order to measure what differences, if any, there were between the treatment group and the control group for the total group and at each grade level. Even though subjects were randomly assigned to treatment levels, the analysis of covariance was chosen to increase the power of the significance test (Huck, Cormier, & Bounds, 1974).

The statistical design used was a two-way analysis of covariance, treatment by grade. In this analysis, treatment refers to two levels, an experimental treatment and a control condition while grade referred to the four grade levels. The analysis of covariance was repeated six times: once for each of the five creativity subscores and once for the overall creativity index. The appropriate pretest served as the covariate in each case. Subjects were included in the

study if they had complete data on both the pretest and the posttest.

Each analysis of covariance tested the following statistical null hypotheses:

1. Pooled over both treatment and control conditions, the mean is the same regardless of grade.

2. Pooled over all four grades, the mean is the same regardless of treatment or control condition.

3. The relative effects of the treatment and control conditions are the same at each grade level.

An F test was used for testing these hypotheses. A probability level of less than .05 was established as significant for rejecting the null hypothesis. Primary interest is with rejecting the second null hypothesis which would indicate significant differences do exist between the treatment and control conditions. A significant interaction (hypothesis number three) would imply that the main effect fails to generalize over all grade levels.

The means and standard deviations and the results of the analysis of covariance are shown in Appendix B. Since there were no significant differences in any of the analyses, all three null hypotheses were not rejected. This data, therefore, failed to confirm the hypothesis that the treatment condition would increase the creativity scores of students in grades one through four.

Discussion

The results of this study do not support the proposition that relaxation training and imagination exercises will enhance the creativity of elementary-age children. Since the instrument used to assess creativity was well suited to the test design and is reliable and valid, it would seem that if there were significant differences due to the treatment, they would have been revealed. The question of why such differences were not found should be addressed.

One event which may have affected the results should be noted. Although the posttests were scheduled to be given during a normal school week, they were inadvertently given the same week that standardized achievement tests were administered. The researchers noted that the children seemed disinterested in performing the figural activities of the Form B test. They seemed to view the posttest as just one more in a string of tests for the week. Since administration of the TTCT is supposed to be in a "game-like, thinking, or problem-solving atmosphere" (Torrance, 1974, p.4) rather than a threatening or stressful one, the juxtaposition of a battery of achievement tests with the creativity test may have influenced the results. In fact, the tables of means reveal that in most cases, the scores decreased from pretest to posttest, although not significantly. A future study would more carefully control for this threat to validity by insuring that the posttests are given in the proper atmosphere.

Another aspect of the study which should be commented on is the difficulty in ascertaining whether or not the children are experiencing the effects of the treatment. That is, actual relaxation effects were not actually measured during the treatment sessions. Without accurate biofeedback equipment closely monitored for each individual, it is difficult to determine if the relaxation response is occurring. "You have to use your subjective judgement as to how loose the children's muscles are getting to decide when to advance through the stages of relaxation and when to advance beyond relaxation" (Schneider & Robin, 1977, p. 24). One suggestion for future studies would be for the researchers to use the Colorimeters not only as self-monitors for the children but also as rough assessment by the researchers of the relaxation response in each individual. That is, the researchers could determine how well each child

is responding to the relaxation training by noting the color level and the improvements made on the Colorimeter.

Just as each individual's relaxation response is difficult to assess, so is each individual's engagement in the imagination exercises. There is no objective way of assessing whether or not each child is in fact using imagination during the suggested exercises. Perhaps each child could be asked to report her/his experiences in order for the researchers to gauge the effect that the exercises are having. This is, of course, difficult in a group setting. In fact, the group setting is in itself somewhat of a drawback since "in a large group, it is sometimes difficult to tailor the individual exercises, to respond to all questions, and to involve all the children in a meaningful discussion" (Proeger, 1982, p. 25). This is a problem that is, however, usually present in a classroom setting and which must be accommodated as effectively as possible.

Although the results of this study did not support the original hypothesis, the researchers felt from their own observations that the children enjoyed the relaxation training and the imagination exercises. They often tried to outdo one another in reporting the amazing fantasy that each had experienced during these activities. Further research which investigates the relationship between relaxation and imagination exercises and creativity seems warranted. For example, both shorter and longer periods of training could be studied. Also, since the Kearns' study (1979) found that a treatment condition similar to that of this study did effect the creativity of gifted children, further studies might focus on what population of students will benefit most from relaxation training and imagination exercises. Since the relaxation response is known to improve physical and mental health as well as achievement, behavior,

and self concept (Benson, et. al, 1974; Ballenger, 1981; Schneider & Robin, 1977), it certainly should continue to be investigated and implemented into the classroom.

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Appendix A

Weekly Session Outline

1. 40 minutes: Explain concept of relaxation and our goal of learning to relax.

   Deep Relaxation (Hendricks & Wills, 1975, p.41). This exercise dissolves muscle tension.

   Play "What's changed?", a teacher-designed game where one person changes three things about oneself and her/his partner tries to guess what.

2. 40 minutes: Review of concept of relaxation.

   Talking to Body (Hendricks & Wills, 1975, p. 48). A dialogue with the body to build a positive body image.

   Repmacs (Eberle, 1977, p.55). A game of unusual uses for common objects.

   Pipe cleaner game, a teacher-designed game where each child forms a pipe cleaner into any shape and shares it with the group.

3. 20 minutes: Review of relaxation concept.

   Introduction to Colorimeters. Have children tense their muscles and see what color the card is. Then do following relaxation exercise to see if they can change the card to green or blue.

   Counting Breaths (Hendricks & Wills, 1975, p. 31). Quieting the mind by focusing on breathing.

4. 20 minutes: Use Colorimeters during playing of deep relaxation procedure on yoga recording (Kohloff, 1970).

   What in the World (Eberle, 1977, p. 49). A guided fantasy of imagining a lost object.

5. 20 minutes: The Relaxing Cloud (Hendricks & Roberts, 1977, p. 59). Imagining oneself floating in a cloud to relax the body.

   What in the World. Part two of last week's fantasy.

   Each child shares her/his fantasy with the group.

6. 20 minutes: Grounding (Hendricks & Wills, 1975, p. 96). Using imagery to connect oneself to the ground.

   Boys & Girls (deMille, 1976, p. 51). An imagination exercise which asks children to manipulate images of boys and girls in funny ways.

   Here (deMille, 1976, p. 173). Game whose purpose is to bring the child's attention back to reality.

7. 40 minutes: Slow Walking (Hendricks & Wills, 1975, p. 133). An exercise to increase awareness of the minute movements of the body.

   Relaxation recording where listener is taken slowly down an escalator to one's innermost level.

   Use Colorimeters to self monitor relaxation level.

8. 20 minutes: Grounding (Hendricks & Wills, 1975, p. 97)

   Doing Things, Showing Feelings, Being Things (Eberle, no date). A pantomime game where each child in turn draws a situation card and pantomimes it.

9. 40 minutes: Relaxing Cloud (Hendricks & Roberts, 1977, p. 59)

   Rhythm (Plum, 1980). A recorded guided fantasy that first relaxes the child and then makes the child aware of rhythms in the world.

   Follow-up activities (Plum, 1980, p. 34).

10. 40 minutes: Rag Doll (Hendricks & Roberts, 1977, p. 71) Body relaxation achieved by collapsing like a rag doll.

    Journey to the Center of the Earth (Plum, 1980). A recorded fantasy that first relaxes the child and then takes an imaginary journey to the center of the earth.

    Follow-up activities (Plum, 1980, p. 61).

11. 40 minutes: Floating on a Stream (Plum, 1980). A recorded fantasy that takes the child on a peaceful journey down a stream.

    Follow-up activities (Plum, 1980, p. 20).

12. 40 minutes: Unknown Planet (Plum, 1980). A recorded fantasy that first relaxes the child and then transports her/him to an unknown planet where there are strange but friendly creatures.

    Follow-up activities (Plum, 1980, p. 42).

Appendix B

Tables 1-12

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR FLUENCY

		Pretest		Posttest		
				Obtained		Adjusted
	N	M	SD	M	SD	M
Treatment 1st	11	20.36	5.80	18.27	7.71	18.61
Treatment 2nd	13	18.00	4.76	19.92	6.03	20.58
Treatment 3rd	10	23.50	6.74	21.70	6.17	21.62
Treatment 4th	11	29.64	8.69	20.82	7.90	19.91
Control 1st	12	23.58	4.89	19.58	7.03	19.49
Control 2nd	12	18.33	4.46	19.92	4.19	20.53
Control 3rd	12	25.08	6.78	22.50	6.88	22.21
Control 4th	13	25.31	7.03	19.92	4.80	19.60

TABLE 2

ANALYSIS OF COVARIANCE FOR FLUENCY

Source	SS	df	MS	F
Group	1.77	1	1.77	.04
Grade	101.13	3	33.71	.83
Group X Grade	5.10	3	1.70	.04

TABLE 3

MEANS AND STANDARD DEVIATIONS FOR ORIGINALITY

		Pretest		Posttest		
				Obtained		Adjusted
	N	M	SD	M	SD	M
Treatment 1st	11	14.09	6.79	9.55	3.78	9.62
Treatment 2nd	13	11.62	2.87	10.00	4.51	10.52
Treatment 3rd	10	17.00	5.60	13.50	3.81	13.06
Treatment 4th	11	14.73	5.00	10.64	6.36	10.60
Control 1st	12	14.67	3.82	9.42	4.17	9.39
Control 2nd	12	13.33	3.45	11.58	4.89	11.80
Control 3rd	12	15.67	6.84	8.58	5.12	8.38
Control 4th	13	15.69	4.92	10.23	3.14	10.02

TABLE 4

ANALYSIS OF COVARIANCE FOR ORIGINALITY

Source	SS	df	MS	F
Group	25.83	1	25.83	1.28
Grade	34.71	3	11.57	.57
Group X Grade	109.06	3	36.35	1.80

TABLE 5

MEANS AND STANDARD DEVIATIONS FOR ABSTRACTNESS OF TITLES

		Pretest		Posttest		
				Obtained		Adjusted
	N	M	SD	M	SD	M
Treatment 1st	11	4.00	3.22	3.09	2.98	3.28
Treatment 2nd	13	3.92	2.60	1.77	1.69	1.97
Treatment 3rd	10	6.60	3.17	2.80	2.30	2.68
Treatment 4th	11	6.64	2.25	2.73	2.87	2.60
Control 1st	12	4.92	4.70	1.75	1.66	1.83
Control 2nd	12	4.33	2.57	2.58	2.50	2.74
Control 3rd	12	8.00	1.71	2.08	1.78	1.79
Control 4th	13	6.54	3.23	3.62	2.26	3.50

TABLE 6

ANALYSIS OF COVARIANCE FOR ABSTRACTNESS OF TITLES

Source	SS	df	MS	F
Group	.66	1	.66	.13
Grade	9.05	3	3.02	.59
Group X Grade	24.32	3	8.11	1.58

TABLE 7

MEANS AND STANDARD DEVIATIONS FOR ELABORATION

		Pretest		Posttest		
				Obtained		Adjusted
	N	M	SD	M	SD	M
Treatment 1st	11	6.73	1.68	4.55	1.37	5.04
Treatment 2nd	13	8.15	1.57	5.23	1.09	5.40
Treatment 3rd	10	9.60	2.46	5.90	2.23	5.74
Treatment 4th	11	9.91	1.45	5.73	2.10	5.50
Control 1st	12	8.50	1.78	5.33	1.44	5.43
Control 2nd	12	8.83	1.03	5.67	1.50	5.68
Control 3rd	12	10.67	2.06	5.50	1.45	5.10
Control 4th	13	8.92	2.10	5.54	1.33	5.53

TABLE 8

ANALYSIS OF COVARIANCE FOR ELABORATION

Source	SS	df	MS	F
Group	.01	1	.01	.00
Grade	1.31	3	.44	.19
Group X Grade	3.58	3	1.19	.51

TABLE 9

MEANS AND STANDARD DEVIATIONS FOR RESISTANCE TO CLOSURE

		Pretest		Posttest		
				Obtained		Adjusted
	N	M	SD	M	SD	M
Treatment 1st	11	7.82	2.40	5.18	2.93	5.21
Treatment 2nd	13	8.77	1.42	5.85	2.34	5.85
Treatment 3rd	10	9.40	1.43	7.30	3.13	7.29
Treatment 4th	11	9.64	1.80	5.27	3.32	5.26
Control 1st	12	9.33	1.72	5.08	1.83	5.08
Control 2nd	12	9.25	2.45	5.92	2.27	5.92
Control 3rd	12	9.69	1.86	5.00	2.86	5.00
Control 4th	13	9.12	1.70	6.62	2.02	6.60

TABLE 10

ANALYSIS OF COVARIANCE FOR RESISTANCE TO CLOSURE

Source	SS	df	MS	F
Group	1.49	1	1.49	.22
Grade	12.70	3	4.23	.62
Group X Grade	38.58	3	12.86	1.88

TABLE 11

MEANS AND STANDARD DEVIATIONS FOR CPEATIVITY INDEX

		Pretest		Posttest		
				Obtained		Adjusted
	N	M	SD	M	SD	M
Treatment 1st	11	112.27	18.73	95.45	13.55	95.23
Treatment 2nd	13	99.38	7.90	92.92	9.29	95.89
Treatment 3rd	10	112.60	12.37	98.50	14.90	98.19
Treatment 4th	11	115.18	7.77	91.27	18.37	90.32
Control 1st	12	118.75	14.07	94.67	11.52	92.83
Control 2nd	12	104.25	7.07	96.50	12.35	98.26
Control 3rd	12	115 92	12.18	89.25	12.88	88.12
Control 4th	13	113.85	12.01	91.62	8.35	91.00

TABLE 12

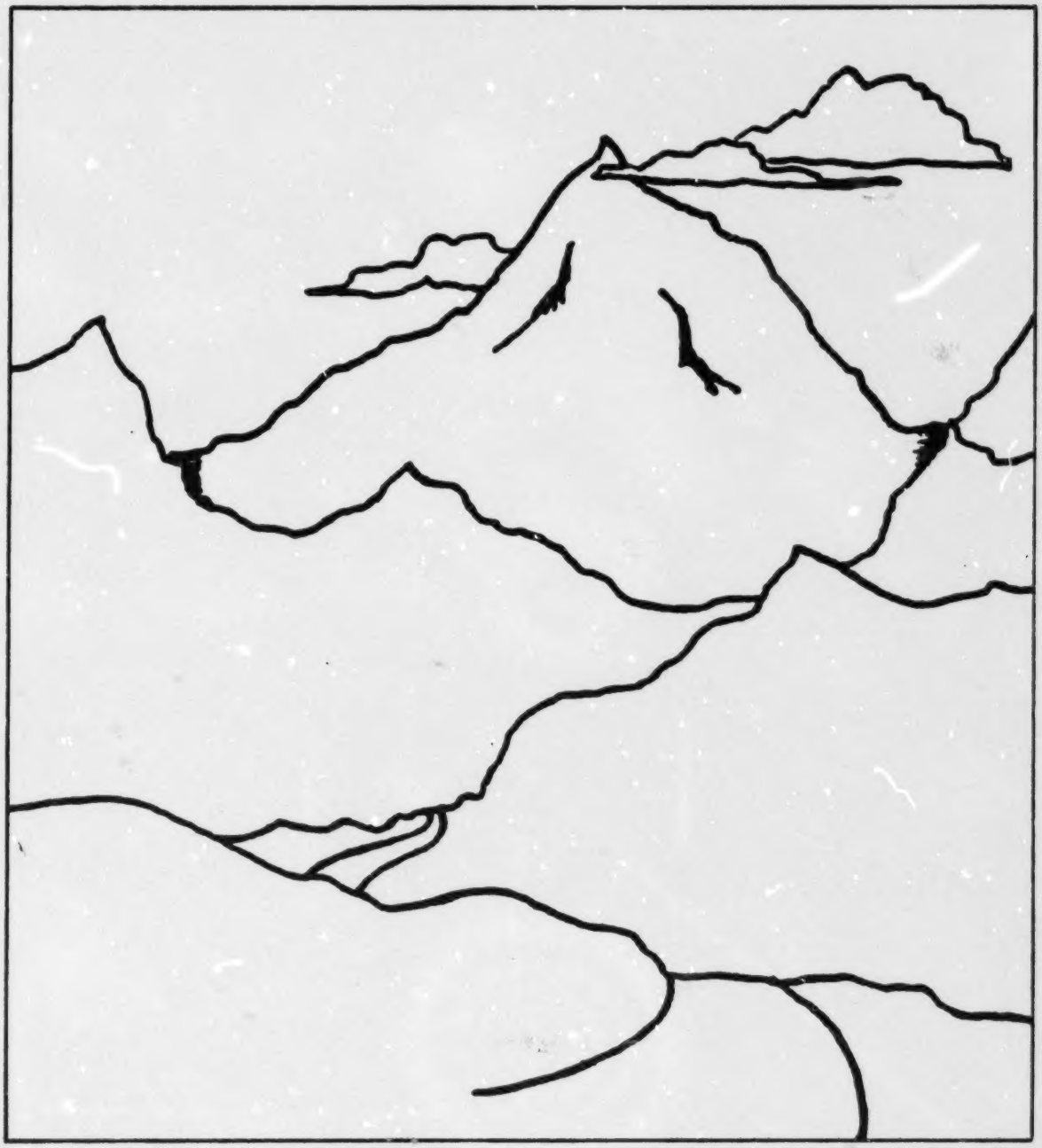
ANALYSIS OF COVARIANCE FOR CREATIVITY INDEX

Source	SS	df	MS	F
Group	126.74	1	126.74	.81
Grade	443.20	3	147.73	.95
Group X Grade	517.57	3	172.52	1.10

NORTHERN ROCKY MOUNTAIN EDUCATIONAL RESEARCH ASSOCIATION FIRST ANNUAL MEETING

October 13, 14, 15, 1983
Jackson Hole, Wyoming

FYI



Cover art work by Julie Collins